# SLAC National Accelerator Laboratory

## Commission to Review the Effectiveness of the National Energy Laboratories Public Meeting

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SLAC NATIONAL ACCELERATOR LABORATORY

# Two key takeaways regarding SLAC

- The laboratory has significantly reinvented itself in the last decade, evolving into a multidisciplinary lab to address the DOE mission and major scientific challenges across disciplines

- SLAC enjoys a unique relationship with its contractor, Stanford University, one that capitalizes on innovative partnerships to more effectively and efficiently implement its strategy

# Laboratory at a glance

Founded in **1962** – operated by **Stanford University**

**1,700 employees** plus ~300 postdoctoral researchers and graduate students

**1,000-plus** scientific papers are published each year based on research at SLAC

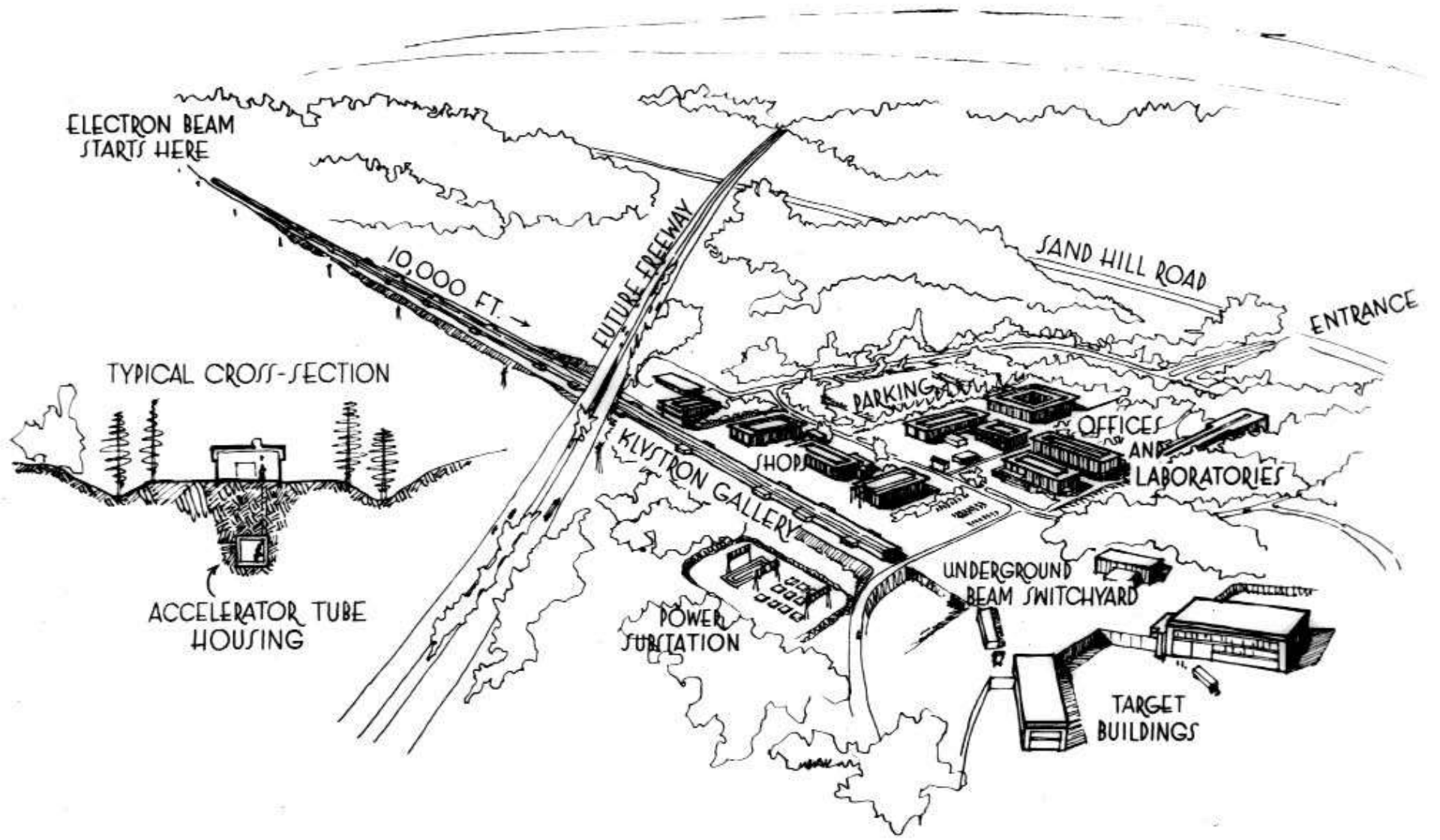
**275 universities** and **55 companies** worldwide use our X-ray facilities

**3,400 scientists** from around the world use our facilities each year

**Six Nobel prizes** have been awarded for research at SLAC

# SLAC was born as a particle physics laboratory in 1962….





# … but has evolved into a multipurpose lab, pushing scientific discovery across disciplines

SLAC

Major scientific and technical challenges

**Innovating and operating premiere accelerator-based facilities**

**Identifying and pursuing new science enabled by our facilities**

**Performing use-inspired and translational research in energy**

**Defining and pursuing a frontier program in cosmology**

Maintain and advance core competencies in accelerators and detectors, and develop them in lasers

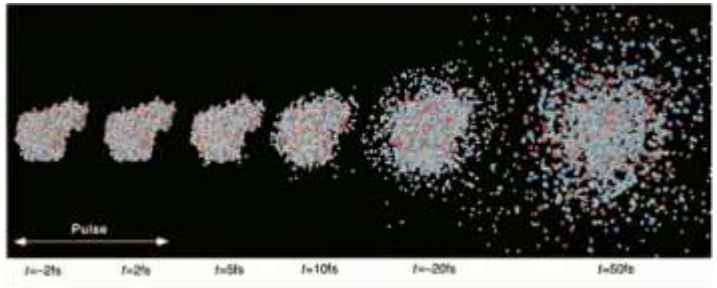
# LCLS: An ultrafast, ultrabright X-ray camera

SLAC

- Eadweard Muybridge and Senator Stanford's horse - Do all 4 feet of the galloping horse leave the ground?

- Shutter speed of 0.001 seconds resolved the galloping question in 1878.

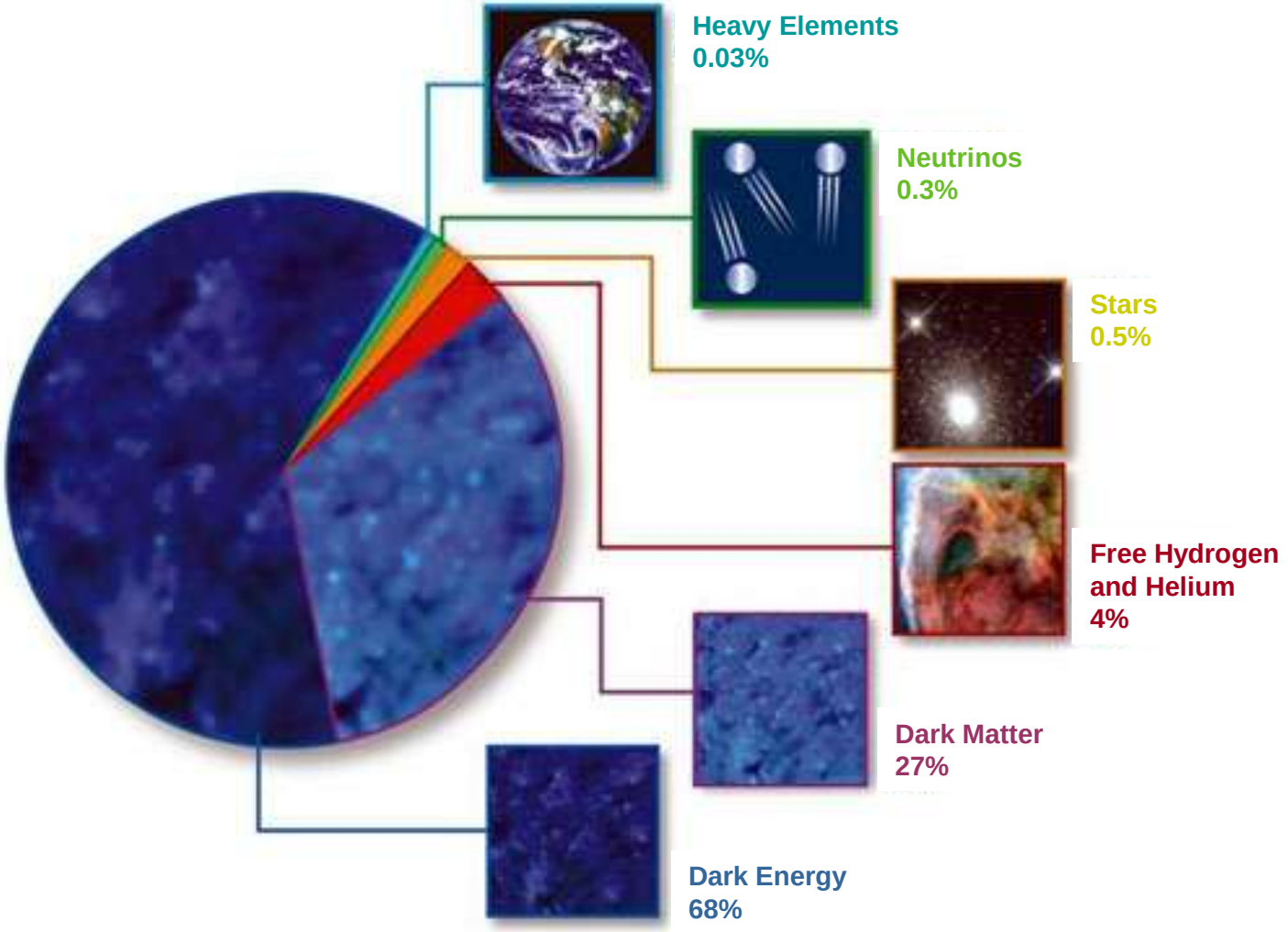
- **LCLS** at SLAC is an X-ray "camera" with shutter speed of 0.00000000000001 seconds




- Scientists can use LCLS to:
  - See atoms and electrons moving
  - Make movies of chemistry in action
  - Unlock secrets of photosynthesis
  - Discover and develop better drugs
  - See 3-D images of biological molecules
  - Better understand cell function
  - LCLS-II will increase capability and capacity

**Disruptive technology revolutionizing discovery science**

# Astrophysics at SLAC: Working to answer the big questions of dark matter & dark energy

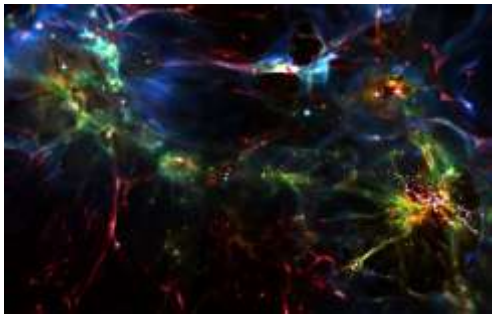


# Innovative partnerships with Stanford University

SLAC

**KIPAC** **Kavli Institute for Particle Astrophysics and Cosmology**

Uses the latest science to further our understanding of the universe, from black holes to dark matter and dark energy



**SIMES** **Stanford Institute for Materials and Energy Sciences**

Studies complex and novel materials with the goal of developing better energy sources and technologies

**PULSE** **Stanford PULSE Institute**

Uses LCLS and other tools to study ultrafast processes in fields such as chemistry, biology, electronics, energy and more

**SUNCAT** **Center for Interface Science and Catalysis**

Explores catalysts, helpful promoters of chemical reactions, to make steps of the energy cycle cleaner and more efficient